

THE DURATION OF THE GROWING SEASON FOR 1898.

The Editor has extracted from the annual summaries of the Climate and Crop Service some details as to the length of the growing season, so far as it is controlled by temperature, during the year 1898. The following table gives a summary of the dates of the last spring and the first autumn frosts; it gives only the approximate mean date for a State or section of a State. The actual dates at any station may have been ten or fifteen days earlier or later, but the total length of the season at any point in the State will scarcely vary ten days from that here given.

State.	Average date of frost.		Length of season.
	Last spring.	First autumn.	
			Days.
Georgia (southern)	March 15.....	October 26.	236
Georgia (northern)	April 7.....	October 25.	201
South Carolina (coast)	March 1.....	November 28.....	273
South Carolina (interior)	April 1.....	October 27.....	210
North Carolina	April 15.....	October 25.....	194
Maryland	April 15.....	October 30.....	199
Delaware	April 7.....	October 17.....	194
New Jersey.....	May 10.....	October 28.....	172
West Virginia.....	April 10.....	October 20.....	180
Texas (coast)	none	December 10.....	845
Texas (northern)	April 1.....	October 24.....	207
Mississippi	March 20.....	October 30.....	225
Arkansas	April 1.....	October 25.....	208
Oklahoma	April 7.....	October 20.....	197
Missouri	April 11.....	October 20.....	193
Wisconsin	May 1.....	September 20.....	143
Minnesota (southern)	May 5.....	September 15.....	134
Minnesota (northern)	May 20.....	September 9.....	113
South Dakota	May 1.....	September 21.....	144
California (northern coast)	January 28.....	November 20.....	297
California (middle)	February 23.....	December 1.....	262
California (southern)	March 28.....	November 15.....	232
California (special regions)	April 7.....	November 15.....	232
	May 6.....	November 10.....	168
	May 23.....	October 1.....	132

RIBBON LIGHTNING.

The annual report for 1897 of the G. V. Juggarow Observatory Vizagapatam, India, contains some special remarks on the thunderstorms of that year. The sudden oscillations of pressure and temperature are shown by the self-recording instruments. On June 2 the record says:

A light shower fell, with a gust of wind from the north, and lasted for an hour. The peals of thunder were not very loud nor frequent. The flashes of sheet lightning were very frequent, but there were only a few flashes of forked lightning. One flash of forked lightning which appeared to the south was particularly vivid, having the appearance of a broad ribbon perpendicular to, and extending below, the horizon. The color of some flashes approached a light mauve, possibly due to the amount of dust in suspension in the atmosphere.

So far as we know, the ribbon feature of lightning has hitherto only been detected by means of photography. This seems to be the first case in which it was apparent to the naked eye.

UNNECESSARY TORNADO ALARMS.

Under date of May 12, Mr. J. I. Widmeyer, section director for Oklahoma, says:

Long-range forecasters, through their ignorant predictions of tornadoes, are causing much unnecessary alarm to the inhabitants of Oklahoma. Not a single tornado has occurred this year, very few in other years, and the Weather Bureau has not as yet issued a single forecast "Conditions favorable for severe local storms;" but, in spite of this, every time a thunderstorm occurs, or a rain cloud appears in any part of the sky, accompanied by even moderate winds, every cave and cellar is filled with frightened men, women, and children. This undoubtedly causes more deaths as a result of exposure in these damp places than have been caused by all the tornadoes that ever occurred, while the constant fear and excitement have certainly a tendency to cause nervous troubles.

Of the three conditions necessary for the formation of tornadoes, two are distinctly local and can be ascertained by any one without the aid of a hygrometer or even a thermometer. Even should the two local conditions exist there need not necessarily be any cause for alarm, as the third condition which locates areas favorable for storms may be entirely absent. But when we have a temperature of about 70° in the early morning and a sultry humid atmosphere during the forenoon, surface winds fitful and changeable, and when clouds are observed moving in both a northerly and southerly direction, with erratic changes, the southwestern sky in such cases should be carefully scanned, for should danger be imminent it will come from that quarter. Tornadoes occur oftenest in the afternoon and evening, very rarely at night or forenoon.

It seems wise and necessary for the officials of the Weather Bureau to improve every occasion to allay the unnecessary alarm that pervades the community whenever one mentions the subject of tornadoes. Twenty years ago, when the Bureau began to collect and publish fairly correct statistics relative to these storms, the sum total of their number and the attendant destruction was so large as to be very impressive. The figures gathered by the meteorological reporters, purely for meteorological study with a view to the prediction of storms, were converted by sensational writers into a most alarming picture of the condition of the atmosphere in this country. Kansas, Iowa, and other portions of our fair land, became known as "tornado states." Many were frightened away from these States, and those who remained suffered unnecessary terror. Out of the natural desire to avoid a reputation for frequent tornadoes there grew a widespread determination to avoid the use of the word. Good citizens would allow that on very rare occasions they had an occasional "twister" or cyclone, a whirler or cloud-burst, a hailstorm or hurricane, but *never a tornado*. Newspapers shunned the word and insisted on using evasive terms.

In 1884 the Editor prepared for the proposed fourth edition of a little pamphlet entitled: "Weather Maps and How to Use Them," a table of relative frequency that clearly showed, not only the small chance of injury from tornadoes, but also that the chance was just as great in many small eastern States as in the large western States that had come especially under the ban of popular writers. One of the latter even went so far as to upbraid him with shirking his duty in that he did not join in the popular cry "beware of the western tornado."

There is really no more destruction done by tornadoes than by lightning, high winds, hailstorms, droughts, and floods, or other meteoric visitors. Fear and dread are inspired by the general knowledge that harm may occur, but fright and panic do not seize one until the dreaded apparition is at hand and visible. Fright is largely a matter of the nerves and the imagination; fear, of the intellect. Fright is not subject to reason, but fear may be so. By a careful, reasonable study of the maps of tornado tracks our observers will always be able to calm the minds of the citizens. It is unnecessary to resort to the caves and cellars, or to stop our ordinary avocations for fear of a tornado, until we see the cloud in the distance, or are positively certain that one is about to pass near us.

THE CAMPHOR BAROMETER.

A recent number of the weekly bulletin of questions and answers, published by the Secretary of the French Association for the Advancement of Science, submits the following problem:

How can we explain the formation of clouds, threads, and crystals that are produced in the so-called chemical or camphor barometer, which consists of a solution in alcohol of equal parts, of three substances, the nitrate of potash, camphor, the hydrochlorate of ammonia, if the glass tube that contains this solution is hermetically sealed, and the varia-

tions of temperature to which it is subjected have no influence on the phenomenon?

This form of barometer is found everywhere in English-speaking countries under the names of "the farmers' weather glass," "the domestic barometer," or some other equally misleading title. In some forms that the Editor has tested, there is scarcely any apparent change in the clearness of the liquid, year after year. In other instruments, the crystals of camphor assume different forms, from day to day, which are certainly very interesting to observe and study, but have nothing to do with the weather and storms, and even less than one would expect, with the current temperature. To the meteorologist and farmer, these instruments have no value, but to the student of molecular physics, they are well worth an investigation.

The gas in the space above the liquid being a mixture of air and vapor of alcohol exerts a very variable pressure upon the liquid below; the latter is saturated with the three chemicals above mentioned, but as its temperature and pressure vary, it alternately rejects and absorbs a slight surplus of camphor. The rapidity with which this change takes place appears to decide the question as to the crystalline or fibrous structure of the visible cloud. Nearly all the changes in the appearance of the camphor cloud seem to depend upon the rate at which the changes of temperature take place, and the time that is given to the solid to collect into larger crystals and settle to the bottom or rise to the top, according to the relative density of different parts of the liquid. The ascending and descending currents going on within the liquid are slow and barely appreciable, but must have an effect upon its cloudy appearance.

AN OBJECTIONABLE NEW METEOROLOGICAL TERM.

The Weather Bureau does not adopt a new term or modify the usage of old terms until such change has come to have a well established meteorological and scientific use. Its own publications can only be made intelligible to its readers by a mutual agreement that each party adopt standard English both as to grammar and dictionary. Thus, when we predict a hurricane, it is not to be questioned that we mean an extensive, destructive storm of wind, and we do not mean a thunderstorm or a tornado, or even, necessarily, a heavy rain. When we predict thunderstorms or tornadoes, we do not mean cyclones or hurricanes or general windstorms or dust whirls. When we predict blizzards, we do not mean "snow tornadoes." This last expression is the newest addition to the sensational or Dolly Varden system of nomenclature that finds favor with some popular writers. So far as we know it first appeared in the North American Review for January, 1899, page 121, where it is used by Dr. F. L. Oswald without any special definition, as though it were a term familiar in every day use. He applies it to the front of a blizzard "that flies 400 miles farther south before it gets finally arrested for trespass on the reservation of the actual Tropics." He speaks of "the snow tornadoes that sweep from the polar regions to the very gates of the Tropics as distinctly an American institution as * * *," and again, of "the much maligned snow tornadoes that traverse a bee line route equaling the distance from northernmost Norway to the center of the Sahara." From these three expressions we judge that the snow tornado is equivalent to what is known in America as the blizzard and in Russia as the buran.

The combination of snow and high wind, followed by very low temperatures, that constitutes the blizzard, has no right to be called a tornado. The violence of the wind does not in the slightest degree approach that of a tornado or even that of a well-developed hurricane. The wind of the blizzard is

a straight-line, horizontal wind, sometimes rolling back on itself; the wind of the tornado has a steep ascent and something of a whirl round a vertical axis. In the tornado a sudden barometric depression occurs and the air within a building expands outward and tears the building to pieces; in a blizzard there is no conspicuous fall in pressure, but a rapid rise as soon as the wind strikes the station. The tornado occurs in warm weather and has its origin in a cloud immediately above the station; the blizzard occurs in cold weather and has its origin in a very extensive mass of cold, dry air.

Snow whirls, like dust whirls, have nothing tornadic in their nature or origin; they occur in connection with blizzards, but do not convert the blizzard into a tornado.

One might as well speak of a tornado as a "warm-air blizzard" as to call a blizzard a "snow tornado," and we hope that neither expression will take hold of the popular fancy. The words blizzard and cold wave have come into recognized popular and scientific use since the Weather Bureau was established in 1870; they were expressive and frequently needed as convenient terms for daily use, but we hardly see the necessity for this newest term. We are curious to learn whether there is any locality where the term "snow tornado" is in use.

For the present the MONTHLY WEATHER REVIEW will continue to use the words hurricane, typhoon, cyclone, low pressure, high pressure, thunderstorm, tornado, and blizzard in their well-recognized scientific meanings.

WEATHER BUREAU MEN AS UNIVERSITY LECTURERS.

Many of our colleges and universities have, during the past twenty years, expressed a desire to secure instructors in meteorology, but have expressed regret that funds are not available for the establishment of full courses of instruction in the subject.

Fortunately, however, among the Weather Bureau officials may be found many who are willing to devote a portion of their time to the instruction of young men, and occasionally the employees of the Bureau receive invitations to deliver courses of lectures that must, eventually, as we fondly believe, lead to the full recognition of meteorology as an important branch of study.

The latest action in this respect has been that taken by the Board of Regents of the University of California, on June 16, when Mr. Alexander McAdie, Forecast Official of the Weather Bureau, was appointed "Honorary Lecturer on Meteorology, in the University, for the academic year 1899-1900." Prof. A. O. Leuschner, at the head of the department of civil engineering and astronomy, upon learning of this appointment, added: "I hope that we may now succeed in building up a department of meteorology in the University." We can not doubt but that many students of the subject will listen to Mr. McAdie's course of lectures, and that much good will be done thereby, but if a department of meteorology is to be built up in the University it must be done by the consecration of one's whole time and energy to that work, as is shown by the pioneer work done in this line by Prof. Wm. M. Davis and R. DeC. Ward, at Harvard University.

We notice that by a recent decision of the faculty of Harvard, meteorology has been placed on the list of subjects that may be offered for examination by young men who desire to enter the freshman class of that institution. This is in accord with the growing tendency to introduce the study of elementary meteorology into the high schools and preparatory collegiate academies of the country.

During the past year Dr. O. L. Fassig has not only completed his own studies for the degree of Ph. D., being the